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# An Evaluation of the Comparative Advantage of Pistachio Export and its Effective Factors

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## Abstract

Export is one of the most reliable ways for economic growth of every country provided that it is correctly planned and the exporting products of that country can compete with other products in the world market. A product is merely visible in world market, if the exporting company, first, has comparative advantages related to that product and second, it has developed and made productive those advantages with appropriate and correct planning. Regarding the importance and value of non-oil exports in Iran and its currency-making value, it has been endeavored to study and assess the comparative advantage of exporting pistachio and the factors affecting it. The population of the research data related to the variables of currency rate and its changes, exporting price, domestic production, domestic price and gross national product (GNP) were collected quantitatively through library research from 1981 to 2012. In this research, BLSA coefficient (RCA) is used to obtain comparative advantage of pistachio export. The supply function estimation of pistachio was obtained using regression by SPSS Software to find the factors affecting the supply function of pistachio export. In this study, some factors including currency rate and its fluctuations, exporting price, domestic price, domestic production and gross national product were chosen. The results obtained by the research indicated that, in general, pistachio export has high relative advantage but two factors of gross national product and domestic price have a positive relation with pistachio export influencing the model.

**Keywords:** Comparative Advantage, Supply Function Estimation, Earnings Function Estimation, Pistachio Export.

## Introduction

Exports of goods and services play an important role in the economy of countries. When commerce and trade is growing, all the countries of the world try to make their economic growth more active by adopting appropriate strategies and polices. Therefore, competition in the area of trade increases leading to success in those countries that have adopted a certain strategy for exporting their products and goods. (Pal,1992)

Paying attention to relative advantage in different economic activities is an important aspect of economic planning. Of course, relative advantage is not a permanent and static point. There is the possibility that it changes over time from one region to another region or a country to another country or in a district or from a product to another product. But, this is a gradual transfer and can be maintained and reinforced by adopting appropriate strategies and policies (Azizi & Yazdani, 2004).

Developing countries usually face the problem of lack of capital that is one of the most important sources for production. Maybe, they have plenty of other sources, but they are wasted due to lack of optimal usage. The result of this process is low productivity. Hence, in order to develop and progress, these countries should spend their limited capital in a way that it initially leads to using other production factors and increasing their productivity and secondly, production resources should be utilized to produce those products and goods that have national and regional comparative advantage (ibid). Therefore, goods are ranked based on their comparative advantage and the activity pattern or model will be based on the principle of relative advantage leading to increasing productivity and optimal usage of production resources. In the next stage, the manufactured goods that have comparative advantage enter the area of commerce or trade. They cause more investment by obtaining foreign cur-

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rency. Consequently, trade can act as the growth engine of the country (Akhavan ,1996).

Comparative advantage was first introduced by Adam Smith in international trade literature. In fact, the cause of trade has been determined by it. According to Smith theory, if a country can produce a product more cheaply than another country and the latter country produces a product cheaper than the former one, each of the countries has advantages in manufacturing the product that they produce cheaply. So, if each of the countries attempts to export the product they have advantage in and import the product they do not have advantage in. Therefore, both countries will benefit from the exchange (Adam Smith, Absolute Advantage Principle).

Based on the concept of comparative advantage, if a product is produced more cheaply than another one, there is a comparative advantage in the production of that product. In addition, if a country is able to export the expected product with a lower cost in comparison to other countries, it has comparative advantage over the countries.

In Iran, despite emphasizing on the increase of non-oil exports during recent years particularly during the years of the First Plan of Development and the beginning years of the Second Plan of Development, we can dare to say that the issue of comparative advantage of exporting goods, especially the industrial ones has remained unidentified. Therefore, since, in recent years, the issue of developing non-oil products has received great attention owing to the recession in oil markets and the negative effects imposed on the country by single-product's exports, adopting this policy requires assessing and identifying comparative advantages of the country in manufacturing different products, reinforcing these advantages and then exporting these products to other countries.

## Statement of the Problem

Export is one of the most reliable ways for economic growth of every country, provided that it is correctly planned and the exporting goods of that country are able to compete with other products in world markets. A product is able to compete with other products when, first, the exporting country has comparative advantage over that product. Second, the country develops and exploits that advantage by proper planning. Comparative advantages, in comparison with other countries, include cost, facilities, natural resources, access to exporting markets, transportation, maintenance, quality, production centers and so on.

Therefore, in order to identify comparative advantage in the area of production, we must specify production factors and the quality and quantity of the coefficients of comparative advantage to be able to calculate comparative advantage in the process of manufacturing goods and products. In addition to the changes and technological developments that create a kind of complexity in comparative advantage theory, supplying and offering goods to world markets, that is, "exporting goods" stage can also have an influence on "comparative advantage". Indeed, in international markets, important factors like world demand for the product, transportation costs, marketing and commercial advertisement, international insurance services can create limitations for "comparative advantage" in the area of international economy and economic activities (Mostafavi *et al*, 2008).

Regarding the importance and value of non-oil exports and the foreign currency obtained by pistachio export as one of the most fundamental industries in the sector of exporting agricultural products, since paying attention to the comparative advantage of economic activities is one of the most important aspects of economic planning, it is of prime importance to determine comparative advantage during time in comparison with rival countries and to estimate exporting supply functions and instability indicator of export earning of this product to increase exporting performance and develop the export. The instability of earning is calculated by using supply function and the factors affecting the supply export. High instability in exporting earning is due to lack of a specific strategy in export. As a result, the level of this indicator specifies the level or rate of stability or instability in adopting and performing exporting strategy of pistachio.

## Objectives of the Research

1. Determining comparative advantage or disadvantage of exporting pistachio
2. Estimating supply function of exporting pistachio
3. Studying the factors affecting the supply of exporting pistachio

## Data Collection

This research deals with assessing supply function of pistachio from 1981 to 2011. The variables of the research are quantitative and library research was used to collect data. Data related to variables of the research was collected from statistics and figures available in Central

Bank, Costumes Office, Commerce Ministry, Iran's National Statistic's Organization, World Trade Organization for Development and the reports presented by World Trade Organization (WTO). The data related to Per Capita Gross Domestic Product based on US$ in 2000, and exporting goods and services as well as other variables used in the model that were already introduced, was collected from www.worldbank.org and www.cbi.ir.

## Data Analysis

In the present study, BASA index has been used to determine comparative advantage of exporting pistachio. In order to estimate the supply function for exporting pistachio, a regression method which is based on two stages is used to discover the factors affecting the supply function. SPSS Software was used to analyze the data.

## Review of the Related Literature

In 2004, Azizi and Yazdani determined the comparative advantages of major horticultural products in Iran. The results suggested that Iran's comparative advantage in pistachio is high, it is lowering in date, is high but decreasing in almonds and it is high in orange. With regard to the estimation of supply function for the above chosen products, in the logarithmic linear export supply function of pistachio ,variables of y-intercept,GNP and exchange rate are significant and in export supply function for date, variables of Y-intercept and GNP; in export supply function for apple, variables of Y-intercept and GNP; in export supply function for orange, variables of Y-intercept, domestic price and GNP and in export supply function for almonds, variables of Y-intercept and GNP are significant. Also, in the linear model, significant variables have been identified. The sign of all of these variables agree with the expected variables. Also, instability indicator of export earnings for pistachio, if compared with other products, has the lowest value that, in fact, represents its high stability. The instability indicator for export earning of almonds is higher than the other products which shows its high instability. However, reinforcing the factors affecting the exporting supply, we can increase exporting comparative advantage and decrease the instability of export income by designing an export strategy and create more stability in the trade of agricultural products.

Salami and Pishbahr (2001) studied the existence or non-existence of comparative advantage and the changes of that period, 2000-2010, for a group of horticultural products of the country. The results of the research indicated that, based on the aforesaid five factors, Iran's pistachio has comparative advantage over the pistachio of the rival countries like the United States, China, Turkey and Syria. Based on the two standards of RCA and RSCA, this advantage is high. According to the above standards, Iran's date, if compared with the date of United Arab Emirates and Iraq, does not have comparative advantage but if compared with Australia and England's date, and average world prices, it has comparative advantage. In the last years, Iran's date comparative advantage was constantly fluctuating. Apple and orange have a comparative advantage over the importing countries of these products from Iran but they do not have comparative advantage over famous countries like Italy, Spain and Africa . Iran's almonds does not have comparative advantage over Pakistan with currency rate of E2 and E3 and Kuwait with currency rate of E3. But, it has comparative advantage over countries like UAE, Germany and Average world price. RCA and RSCA show almonds comparative advantage is decreasing .

The major regions of producing each of the chosen products were ranked based on comparative advantage. Export supply functions and export earnings instability indicator were estimated. The results indicated that pistachio has a higher earnings stability over other products and almonds has a higher earnings instability.

Azizi and Yazdani carried out a research titled "the Study of Iran's Pistachio Export (challenges and strategies) on the export and identification of strategies for exporting pistachio from 1970-2000. They used RCA standard. Pistachio export supply function was also calculated. The results suggest that Iran has approached an exporting strategy for pistachio due to the importance of this product and adopting a series of policies in pistachio production and trade . But, among the pistachio exporting countries, the US has had a more careful and regular exporting strategy over the rivals. Iran's pistachio RCA standard shows a high exporting comparative advantage during these years. This standard was increasing from 1948 to 1970 and after that has decreased. It was stable from 1993 to 2002 . The calculated RCA mean (382/6) for Iran's pistachio is more than the other countries. Two methods were used to estimate export supply functions. In linear model, domestic production is significant meaning that domestic production has a positive relation with exporting supply . In logarithmic-linear model, variables of domestic production and currency exchange rate are significant and they have a positive relationship with exporting supply. The relationship between GNP and pistachio export supply is negative.

## Findings

Hypothesis 1: Pistachio export has comparative advantage. Balsa formula was used to evaluate this hypothesis. The following table shows the results of RCA for every year. If RCA value is lower than 1, it does not have comparative advantage and vice versa.

**Table 1. The results of RCA for each year**

| Comparative advantage | RCA | Year |
|---|---|---|
| + | 1.531869 | 1981 |
| + | 1.064065 | 1982 |
| + | 2.674767 | 1983 |
| + | 1.150835 | 1984 |
| + | 1.365309 | 1985 |
| + | 1.117256 | 1986 |
| - | 0.706769 | 1987 |
| - | 0.701132 | 1988 |
| - | 0.646062 | 1989 |
| - | 0.506186 | 1990 |
| + | 5.001113 | 1991 |
| + | 4.163797 | 1992 |
| + | 3.355023 | 1993 |
| + | 2.375052 | 1994 |
| + | 3.531376 | 1995 |
| + | 3.816649 | 1996 |
| + | 2.070133 | 1997 |
| + | 5.350384 | 1998 |
| + | 2.988056 | 1999 |
| + | 3.958063 | 2000 |
| + | 4.373705 | 2001 |
| + | 4.32615 | 2002 |
| + | 3.918967 | 2003 |
| + | 2.936782 | 2004 |
| + | 3.468647 | 2005 |
| + | 2.913987 | 2006 |
| + | 2.581594 | 2007 |
| + | 1.627181 | 2008 |
| + | 1.7361 | 2009 |
| + | 1.601799 | 2010 |
| + | 1.041812 | 2011 |

As the above table shows, pistachio export has comparative advantage except in 1987, 1988, 1989, 1990. This shows that hypothesis 1 has been confirmed. The mean and standard deviation and comparative advantage are shown in table 2. The mean indicates that hypothesis 1 is confirmed.

**Table 2. Mean and standard deviation of variable RCA**

| Variable | Mean | SD |
|---|---|---|
| RCA | 2.53 | 1.4 |

**Table 3. Frequency and the percentage of comparative advantage**

| variable | Mean | SD |
|---|---|---|
| Comparative advantage | 4 | 12.9 |
| no comparative advantage | 27 | 87.1 |
| total | 31 | 100.0 |

Table 3 suggests that in 87% of the years under study, pistachio has had comparative advantage and it has not had comparative advantage in 13% of the years. The mean for variable RCA is also high indicating that pistachio export has had comparative advantage from 1981 to 2010.

Results related to regression analysis In order to analyze the regression relationship between the variables of hypothesis 2, 3, 4, 5, 6 (Analyzing the model and estimating the function elasticity),linear regression was used.

Dependent variable: pistachio export

Independent variables: Pistachio production, exporting price, exchange rate and its fluctuations, domestic price, gross national product

Using SPSS Software, the results of the regression shows that only the two variables of GNP and domestic price has been entered into the model. Therefore, the model is turned into the following model:

Dependent variable: (pistachio export LN)

Independent variables: (pistachio production LN), (Gross national product LN)

Correlation coefficient between independent variables and dependent variable is 0.951 that shows great and positive correlation between these variables. The modified determination coefficient is 0.89 that shows 89% of the changes in dependent variable derives from the changes in independent variables that is a suitable value.

In the above table, regarding that P-Value is lower than 0.05, therefore the processed model in section B is first significant and second valid. The analysis of the regression coefficient has been carried out in the following table:

**Table 4 . Correlation parameters of the model**

| Correlation Coefficient | Coefficient of Determination | Modified Determination Coefficient | Standard Deviation Estimation |
|---|---|---|---|
| 0.951 | 0.904 | 0.897 | 0.32826 |

**Table 5. ANOVA Analysis**

| Title | Sum of squares | Df | Mean square | F | P-value |
|---|---|---|---|---|---|
| Regression | 28.286 | 2 | 14.143 | | |
| Corrected | 3.017 | 28 | 0.108 | 131.24 | 0.000 |
| total | 31.303 | 30 | | | |

**Table 6. Regression coefficients analysis**

| Regression Variables | Non-Standardized Coefficients | | Non-Standardized Coefficients | t | P-value | Telorance | VIF |
|---|---|---|---|---|---|---|---|
| | Coefficient | Standard Deviation | | | | | |
| Fixed Figure | 15.727- | 2.461 | | -6.391 | 000- | | |
| Pistachio Production | 1.681 | 0.303 | 0.593 | 5.543 | 000- | 0.301 | 3.325 |
| GNP | 0.330 | 0.089 | 0.397 | 3.713 | 001- | 0.301 | 3.325 |

The standard coefficient column is used to determine regression model and analyze regression coefficients. First, regarding that P-value of T test is lower than 0.05, therefore, coefficients are not zero (0) and the hypothesis is rejected, that is, the coefficients are statistically significant. Second, with regard to the coefficients, the following regression model will be obtained.

Y= (0.593) X1+ (0.397) X2

where the variables of Y, X1 and X2 are dependent variables: (pistachio export LN) and dependent variable are (pistachio production LN), (Gross national product LN

## Results and Discussion

In the present research in which the objective was to determine comparative advantage and estimate the supply function for pistachio export, the results show that, with regard to the point that the calculated comparative advantage indicator is more than 1 from 1981 to 2010 (except from 1987 to 1990), it turns out that Iran has comparative advantage in pistachio export in the world and the country needs (concerning the changes in RCA) a clear export strategy. Also, the supply function for pistachio export indicates that the domestic price variables and GNP variables influence the supply function.

Regarding the comparison of the results with the results of the previous research, Azizi and Yazdani (2004) determined the comparative advantages of major horticultural products in Iran. The results suggested that Iran's comparative advantage in pistachio is high, it is lowering in date, is high but decreasing in almonds and it is high in orange. With regard to the estimation of supply function for the above chosen products, in the logarithmic linear export supply function of pistachio ,variables of y-intercept,GNP and exchange rate are significant and in export supply function for date, variables of Y-intercept and GNP; in export supply function for apple, variables of Y-intercept and GNP; in export supply function for orange, variables of Y-intercept, domestic price and GNP and in export supply function for almonds, variables of Y-intercept and GNP are significant. Also, in the linear model, significant variables have been identified. The sign of all of the variables is in agreement with the expected variables. If compared with the other products, almonds has a higher comparative advantage which is a sign of higher instability in the export earnings of the product. However, reinforcing the factors affecting the export-

ing supply, we can increase exporting comparative advantage and decrease the instability of export earning by designing a export strategy and create more stability in the trade of agricultural products.

## Implications of the study

Based on the present condition of export and Balsa indicator, we showed that Balsa indicator has a positive slop but it is i fluctuating. Therefore, we should try to discover the factors influencing the growth during those years and try to reinforce and increase those factors.

Since Balsa curve is fluctuating, it shows the lack of a stable strategy during these years. So, we have to seek to perform a stable strategy.

GNP has a positive relationship with pistachio export, therefore, we must try to reinforce the variables that greatly influence GNP and increase the production in order to increase GNP. Therefore, the government should increase investment in manufacturing sectors.

Based on the export supply function, pistachio domestic price has direct influence on the export which shows Iranian businessmen have had good performance and affected the prices thereby pistachio export has increased. If pistachio domestic price is increased, it motivates the exporters to export the product and if the government tries to decrease the price, the exporter's motivation will decrease as well.

## Implications for Further Study

• The determination of appropriate strategies for exporting pistachio based on analyzing domestic weaknesses and strengths and opportunities and environmental threats and drawing SWOT matrix

• Conducting necessary researches on market, marketing and management and productivity of pistachio

• Identification of obstacles and problems facing pistachio export and offering appropriate strategies to obviate them

• Evaluating and prioritizing regional and world markets for pistachio export

• Assessing the comparative advantage for pistachio export in the world and in some regions and comparing the results

• Analyzing the factors affecting the demand function of pistachio export

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